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PSEUDOPOLYDORA DIOPATRA, A NEW SPECIES (POLYCHAETA: SPIONIDAE) FROM TAIWAN

Hwey-Lian Hsieh

Abstract.—A new spionid polychaete species is described from a sandflat on the west coast of Taiwan. *Pseudopolydora diopatra* lives on the tube-caps of the onuphid *Diopatra bilobata.* The species is very similar to *Pseudopolydora paucibranchiata.* Both species are small in size (3–6 mm), have similar setal types on the fifth setiger, and a cup-shaped pygidium. The new species differs from the latter in lacking median antenna, in having fewer pairs of branchiae (5–6 pairs vs. 9–11 pairs), and fewer major setae (4–5 hooks and 6–8 pennoned setae vs. 8–9 hooks and 10 pennoned setae) on setiger 5.

A detailed study of the polychaete fauna from the intertidal areas on the west coast of Taiwan has recently been conducted. The onuphid *Diopatra bilobata* Imajima is one of the most obvious tube-dwellers on the sandflats (Hsieh & Chang 1991). A new *Pseudopolydora* species has been found in association with the tube-caps of *D. bilobata* (Hsieh & Chang 1991). This species is herein described and compared with related species of the genus. The types are deposited in the Institute of Zoology, Academia Sinica, Taipei, Taiwan (ASIZIP), and the National Museum of Natural History, Smithsonian Institution (USNM).

Family Spionidae
Genus *Pseudopolydora* Czerniavsky
Pseudopolydora diopatra, new species
Figs. 1–10

Material examined.—Intertidal sandflat at Hsiang Shan (24°50′N, 120°54′E), Hsin Chu Hsien, northwest coast of Taiwan, Nov 1990, holotype (ASIZIP 9011HS1); 23 paratypes, May 1990 (ASIZIP 9005HS); 14 paratypes, Nov 1990 (ASIZIP 9011HS); 42 paratypes, Nov 1990 (USNM 142034); 10 paratypes, May 1991 (ASIZIP 9105HS-SEM).—Intertidal sandflat at Tung Hsio (24°30′N, 120°37′E), Miao Li Hsien, west coast of Taiwan, 20 paratypes, Jun 1988 (ASIZIP 8806TH); 15 paratypes, Sep 1991 (ASIZIP 9109TH).

Description.—Specimens small; holotype (male) measuring 2.8 mm long, 0.3 mm wide at setiger 5, for 23 setigers (Fig. 1). Paratypes including 25 males, 30 females, 2 juveniles measuring 2.4–2.9 mm long, 0.3–0.5 mm wide at setiger 5, for 20–34 setigers. Dorsal transverse ciliary bands present on setigers 7–10 (see Fig. 10). Black pigmented, ventral transverse bands present on setigers 3–10 of formalin preserved specimens.

Prostomium bifurcate anteriorly (Fig. 2). Caruncle keel–like, extending to posterior edge of setiger 2 (Fig. 2); pair of brown pigment spots sometimes present on posterior caruncle. Eyes numbering 2 pairs, located anterior to palpal bases. Occipital antenna absent. Nuchal organs present posteriorly to palps, lateral to caruncle (Fig. 2). Palps in live specimens with 10–12 transverse yellow bands. Ventral grooves of palps ciliated (Fig. 3). Ventral prostomial surface bearing 1 patch of cilia (Fig. 3).

Notopodia of setiger 1 reduced to small digitiform lobes arising from palpal bases, without setae; neuropodia also reduced, larger than notopodial lobes, with capillary setae (Fig. 2). Subsequent noto- and neuropodia well developed. All notosetae as

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limbate capillaries, most numerous on setigers 2-9 (Fig. 4). Neurosetae of setigers 2–7 as limbate capillaries with fine spines (Fig. 5); broader, shorter, more curved than notosetae in same setigers. Bidentate hooded hooks with constricted shafts, first present from setiger 8, numbering 10–11 per fascicle; apical tooth closely apposed to main fang (Fig. 6). Presetal noto- and neuropodial lamellae of anterior setigers poorly developed; postsetal lamellae forming small lobes (Fig. 7). Major setae of setiger 5 arranged in 2 C-shaped rows: dorsal most row with 4–5 stout falcate hooks (Figs. 7, 8, 9b); ventral most row with 6–8 pennoned setae lacking bristles or flanges (Figs. 7, 8, 9a).

Branchiae numbering 5–6 pairs, present on setigers 7–11 or 12, sometimes unequally distributed on right and left sides of body; inner lateral margins heavily ciliated (Fig. 10).

Remarks.—Twelve species of *Pseudopolydora* have been previously recorded, including *P. antennata* (Claparede) (Okuda 1937), *P. corallicola* Woodwick, 1964, *P. gibbsi* Light, 1974, *P. glandulosa* Blake & Kudenov, 1978, *P. kempi* (Southern) (Berkeley & Berkeley 1954; Imajima & Hartman 1964; Light 1969, 1978; Banse 1972), *P. paucibranchiata* (Okuda) (Okuda 1937, Imajima & Hartman 1964), *P. pigmentata* Woodwick, 1964, *P. primigenia* Blake, 1983, *P. prolifera* (Augener) (Blake & Kudenov 1978), *P. pulchra* (Carazzi) (Eleftheriou 1970), *P. smurovi* Tzetlin & Britayev, 1985, and *P. stolonifera* Blake & Kudenov, 1978. Another four species, *P. bassarginensis* (Zachs) (see Uschakov 1955), *P. derjugini* (Zachs) (see Hartman 1959, 1965), *P. novaegeorgiae* Gibbs (see Blake & Kudenov 1978), and *P. orientalis* (Annenkova) (see Uschakov 1955) are incompletely known. *Pseudopolydora reishi* (Woodwick) has been transferred to the genus *Carazziella* (Blake 1979). Thus, these five species are not included for further discussions.

Pseudopolydora diopatra resembles *Pseudopolydora paucibranchiata* (Okuda 1937, Imajima & Hartman 1964) in that the teardrop-shaped pennoned setae and stout hooks of setiger 5 are sharply tapered and slightly curved, respectively. Both species are moderately small (*P. diopatra* 2–3 mm long; *P. paucibranchiata* 4–6 mm long), and have funnel-shaped pygidia with a dorsal notch. *P. diopatra* differs from *P. paucibranchiata* in having a bifurcate, instead of a rounded, entire prostomium; lacking an occipital antenna; and in having fewer branchiae (5–6 instead of 9–11 pairs). *P. diopatra* also differs from all other members of the genus in such features as setal morphology, numbers of branchiae, prostomial morphology, caruncle length, and shape of the pygidium. The following key to the known species of *Pseudopolydora* reflects these differences. Characters used in this key are modified from those in Blake & Kudenov's study (1978):

Key to Known Species of *Pseudopolydora*

1. Maximal number of segments 15–16; small, up to 3 mm long 2
– Maximal number of segments greater than 20; small to large, up to 30 mm long 4
2. Ends of pennoned setae from setiger 5 bristled; ends not distally enlarged, curved or broom-like ... 3
– Ends of pennoned setae from setiger 5 not bristled; ends distally enlarged, curved, broom-like ... . *P. smurovi*
3. Pennoned setae of setiger 5 with long apex and fenestrated edge surrounding a cavity; prostomium entire ..... *P. prolifera*
– Pennoned setae of setiger 5 with expanded apex; lacking fenestrated edge surrounding a cavity; prostomium incised ..... *P. stolonifera*
4. Prostomium entire 5
– Prostomium incised 7

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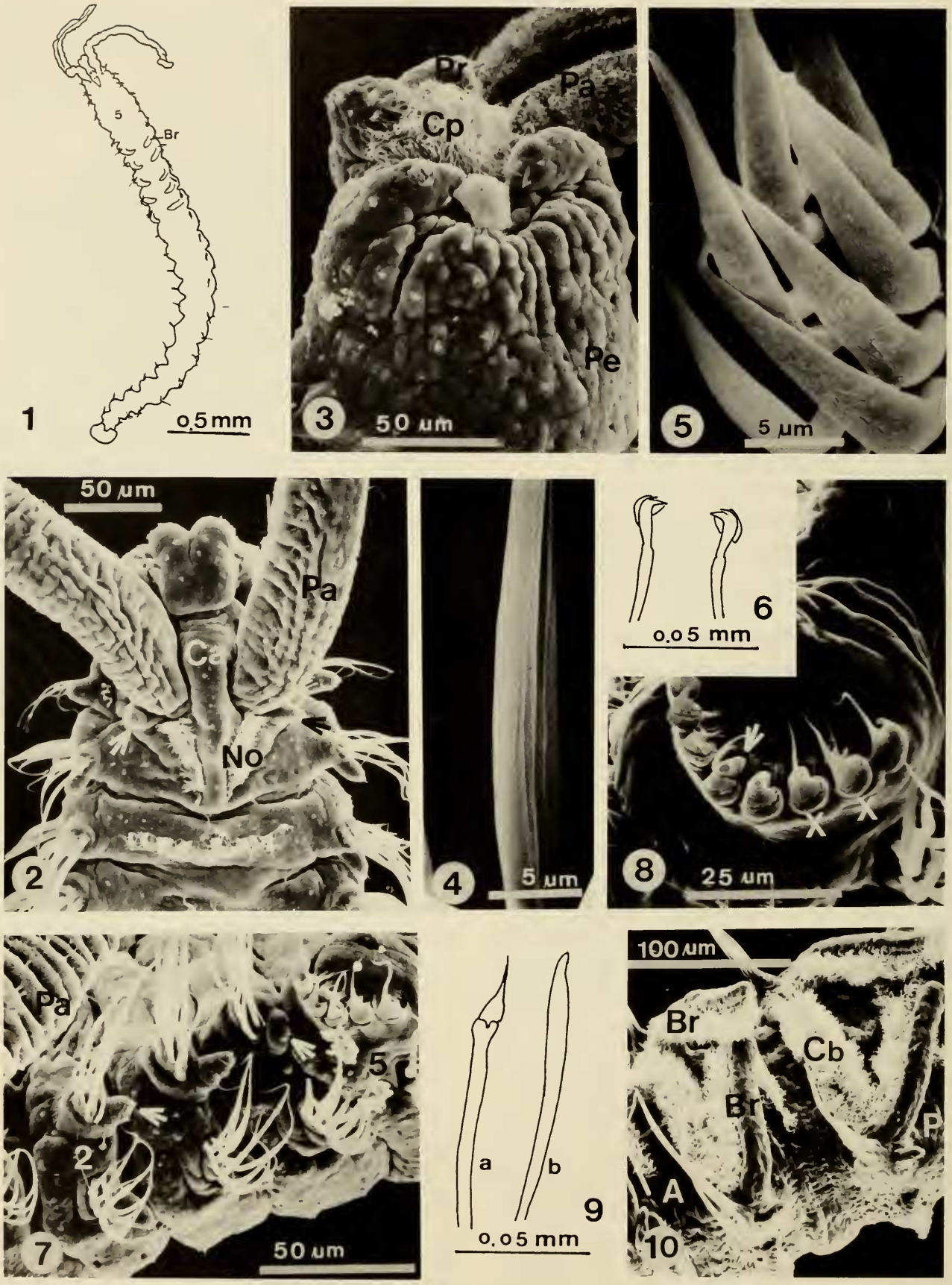

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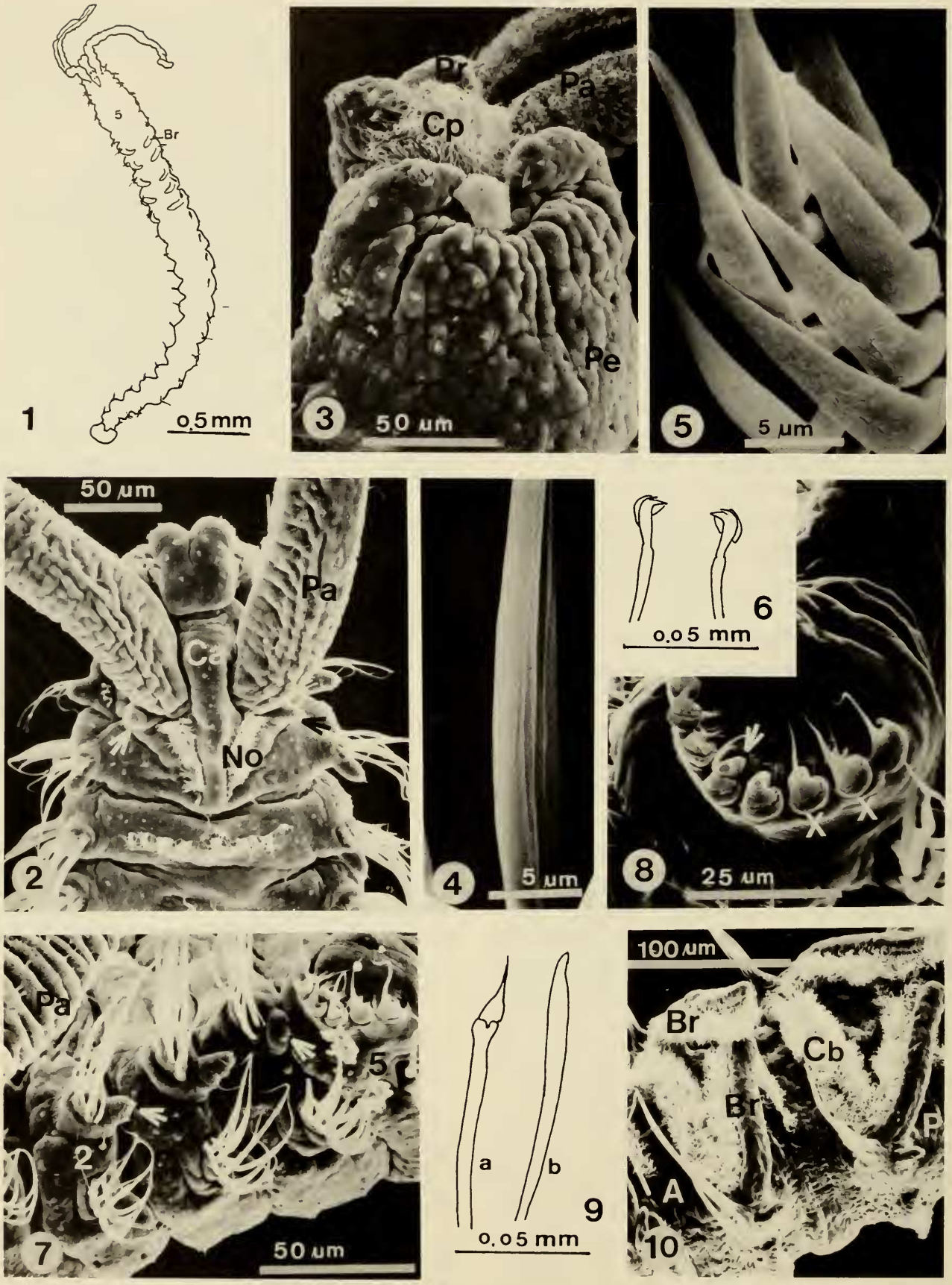

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5. Occipital antenna present ..... *P. paucibranchiata*
– Occipital antenna absent 6
6. Notosetae present on setiger 1; stout, sickle-shaped hooks present in posterior notopodia; strong falcate notosetae absent on setigers 4–5 ..... *P. gibbsi*
– Notosetae absent on setiger 1; stout, sickle-shaped hooks absent in posterior notopodia; strong falcate notosetae present on setiger 4–5 ..... *P. pigmentata*
7. Prostomium deeply incised, produced into conspicuously diverging lobes 8
– Prostomium weakly incised, not produced into conspicuously diverging lobes 11
8. Posterior notopodia with conical bundles of awl-shaped setae; setigers 6–7 each with paired internal glands ..... *P. corallicola*
– Posterior notopodia without conical bundles of awl-shaped setae; setigers 6–7 each lacking paired internal glands 9
9. Pennoned setae of setiger 5 with apices short, tapered, and large subdistal concavities; pygidium notched dorsally and ventrally .. .. *P. antennata*
– Pennoned setae of setiger 5 with apices long, slender, curved, and narrow concavities; pygidium notched dorsally, not ventrally .. 10
10. Prostomium pigmented; caruncle indistinct, extending to setiger 2; pigment pattern absent on anterior setigers ..... *P. pulchra*
– Prostomium not pigmented, caruncle distinct, extending to setiger 4; pigment pattern sometimes present on anterior setigers *P. kempi*
11. Branchiae with glands; hoods of hooded hooks striated *P. glandulosa*
– Branchiae without glands; hoods of hooded hooks not striated ... 12
12. Branchiae present on setiger 11 to 13–15, fused basally with notopodial lamellae; males with an additional pair of branchiae on setiger 2 ..... *P. primigenia*
– Branchiae present on setigers 7 to 12–13, not fused basally with notopodial lamellae; males lacking an additional pair of branchiae on setiger 2 ..... *P. diopatra*

Pseudopolydora diopatra is dioecious and constructs muddy tubes. Larvae are brooded by females in their tubes until they attain the three-setiger stage. After release, the larvae become planktotrophic. Competent larvae have 12–15 setigers and show preference for the tube-caps of the onuphid *Diopatra bilobata.* They are rarely found in sand surrounding the tubes of *Diopatra bilobata* (Hsieh & Chang 1991).

Etymology.—The specific name, *diopatra,* is based on the characteristics of the worms' habitat. *Pseudopolydora diopatra* was found to construct muddy tubes in the crevices of highly decorated tube-caps of *Diopatra bilobata* (Hsieh & Chang 1991).

Habitat.—The type locality is an intertidal sandflat on the northwest coast of Taiwan. Tubes of *Diopatra bilobata* protrude above the sediment. The habitat-habitant relationship between *D. bilobata* and *Pseu-*

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dopolydora diopatra is closely tied into granulometry of the sandflat and worms' tubes (Hsieh & Chang 1991). The median grain sizes of the flat range from 0.17 to 0.18 mm in diameter with modal sizes from 0.15 to 0.21 mm. Silt-clay content is little, less than 2% of dry weight. In contrast, the median particle sizes of *Diopatra* tube-caps are from 0.21 to 0.25 mm in diameter with modal particles larger than 1.00 mm. Silt-clay content in tube-caps is higher, usually up to 18–19% of dry weight. As regards the muddy tubes of *P. diopatra,* the median grain sizes range from 4.6 to 27.9 μm with modal sizes from 4.6 to 15.7 μm. These particles fall well in the category of silt and clay. The tube-caps harbor more silt and clay, in turn, providing *P. diopatra* material for tube construction and for feeding upon (Hsieh & Chang 1991).

Acknowledgments

The author wishes to thank Kristian Fauchald and Linda Ward, Smithsonian Institution for providing references on the genus *Pseudopolydora,* suggesting the specific name and reading the manuscript. Thanks are also extended to Joseph Simon, Department of Biology, University of South Florida for discussions during the study. Special thanks are due two reviewers for their very helpful discussions and comments. Part of this study was supported by a grant to both Chang-Po Chen, Institute of Zoology, Academia Sinica and the author from National Museum of Marine Biology, the Ministry of Education, Taiwan, the Republic of China.

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dopolydora diopatra is closely tied into granulometry of the sandflat and worms' tubes (Hsieh & Chang 1991). The median grain sizes of the flat range from 0.17 to 0.18 mm in diameter with modal sizes from 0.15 to 0.21 mm. Silt-clay content is little, less than 2% of dry weight. In contrast, the median particle sizes of *Diopatra* tube-caps are from 0.21 to 0.25 mm in diameter with modal particles larger than 1.00 mm. Silt-clay content in tube-caps is higher, usually up to 18–19% of dry weight. As regards the muddy tubes of *P. diopatra,* the median grain sizes range from 4.6 to 27.9 μm with modal sizes from 4.6 to 15.7 μm. These particles fall well in the category of silt and clay. The tube-caps harbor more silt and clay, in turn, providing *P. diopatra* material for tube construction and for feeding upon (Hsieh & Chang 1991).

Acknowledgments

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